

Appl. No. 10/032,867
Amdt. dated January 06, 2005
Reply to Office Action of September 28, 2004

PATENT

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A working end of a surgical instrument for delivering energy to tissue, comprising:
paired first and second jaw members moveable between an open position and a closed position; and
at least one jaw including an electrode, a first body portion comprising an electrically conductive material having a temperature-sensitive variable resistance for responding to the temperature of the tissue, and a second body portion of a conductive material coupled to an Rf voltage source, wherein the first body portion is disposed between the second body portion and the electrode to control the passage of electrical current from the second body portion to the electrode and wherein said at least one jaw defines a surface engagement plane for engaging tissue, said engagement plane carrying an exposed surface of said first body portion.
2. (Cancelled)
3. (Currently Amended) The working end of Claim 1 ~~wherein said at least one jaw defines a surface engagement plane for engaging tissue,~~ said engagement plane carrying an exposed surface of said second body portion.
4. (Cancelled)
5. (Previously Presented) The working end of Claim 1 wherein said first body portion comprises a ceramic composition.
- 6-10 (Cancelled)
11. (original) The working end of Claim 1 wherein said first body portion has an electrical resistance that increases with an increase in temperature thereof.

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12. (original) The working end of Claim 1 wherein said first body portion has an electrical resistance that decreases with an increase in temperature thereof.

13. (original) The working end of Claim 1 wherein said first body portion defines a switching range at which its electrical resistance substantially increases or decreases in a selected temperature range.

14. (original) The working end of Claim 13 wherein said switching range falls between about 40° C. and 200° C.

Claims 15-48 (canceled).

49. (Currently Amended) A method for controlled application of energy to tissue, comprising the steps of:

providing a working end with opposing jaws for engaging tissue, at least one jaw defining an engagement surface having a first body portion comprising a variably resistive material having a resistance that positively varies in response to a change in temperature and a second body portion comprising at least one conductor, said first and second body portions being coupled to an Rf voltage source;

engaging tissue between the paired jaws; and

delivering Rf energy to said body portions to cause ohmic heating of the tissue, wherein energy application to said tissue is modulated by changes in resistance of said first body portion to prevent substantial dehydration of tissue proximate to the engagement surface;

wherein said first body portion defines a switching range in which its resistivity is increased to substantially terminate electrical current flow therethrough, and wherein ohmic heating of tissue is eliminated as the temperature of the first body portion reaches said switching range.

50. (Previously Presented) The method of Claim 49 wherein said first body portion has a resistance that varies by greater than about 5 per cent with a change in temperature of less than about 5° C.

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51. (Previously Presented) The method of Claim 49 wherein said first body portion substantially terminates electrical current flow therethrough in any selected switching range between about 40° C. and 200° C.

52. (Currently Amended) ~~The working end of Claim 1~~ A working end of a surgical instrument for delivering energy to tissue, comprising:

paired first and second jaw members moveable between an open position and a closed position; and

at least one jaw including an electrode, a first body portion comprising an electrically conductive material having a temperature-sensitive variable resistance for responding to the temperature of the tissue, and a second body portion of a conductive material coupled to an Rf voltage source, wherein the first body portion is disposed between the second body portion and the electrode to control the passage of electrical current from the second body portion to the electrode wherein said first body portion is a polymeric composition.

53. (New) The working end of Claim 52, wherein said first body portion has an electrical resistance that increases with an increase in temperature thereof.

54. (New) The working end of Claim 52, wherein said first body portion has an electrical resistance that decreases with an increase in temperature thereof.

55. (New) The working end of Claim 52 wherein said first body portion defines a switching range at which its electrical resistance substantially increases or decreases in a selected temperature range.

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56. (New) The working end of Claim 55 wherein said switching range falls between about 40° C. and 200° C.

57. (New) A working end of a surgical instrument for delivering energy to tissue, comprising:

paired first and second jaw members moveable between an open position and a closed position; and

at least one jaw including an electrode, a first body portion comprising an electrically conductive material having a temperature-sensitive variable resistance for responding to the temperature of the tissue, and a second body portion of a conductive material coupled to an Rf voltage source, wherein the first body portion is disposed between the second body portion and the electrode to control the passage of electrical current from the second body portion to the electrode and wherein said at least one jaw defines a surface engagement plane for engaging tissue, said engagement plane carrying an exposed surface of said second body portion.

58. (New) The working end of Claim 57, said engagement plane carrying an exposed surface of said first body portion.

59. (New) The working end of Claim 57 wherein said first body portion comprises a ceramic composition.

60. (New) The working end of Claim 57, wherein said first body portion has an electrical resistance that increases with an increase in temperature thereof.

61. (New) The working end of Claim 57, wherein said first body portion has an electrical resistance that decreases with an increase in temperature thereof.

62. (New) The working end of Claim 57 wherein said first body portion defines a switching range at which its electrical resistance substantially increases or decreases in a selected temperature range.

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63. (New) The working end of Claim 62 wherein said switching range falls between about 40° C. and 200° C.

64. (New) A working end of a surgical instrument for delivering energy to tissue, comprising:

paired first and second jaw members moveable between an open position and a closed position; and

at least one jaw including an electrode adapted for contacting tissue, a first body portion comprising an electrically conductive material having a temperature-sensitive variable resistance for responding to the temperature of the tissue, and a second body portion of a conductive material coupled to an Rf voltage source, wherein the first body portion is disposed between the second body portion and the electrode to control the passage of electrical current from the second body portion to the electrode responsive to the temperature of contacted tissue and wherein said at least one jaw defines a surface engagement plane for engaging tissue, said engagement plane carrying an exposed surface of said first body portion.

65. (New) The working end of Claim 64, said engagement plane carrying an exposed surface of said second body portion.

66. (New) The working end of Claim 65, wherein said first body portion comprises a ceramic composition.

67. (New) The working end of Claim 64, wherein said first body portion has an electrical resistance that increases with an increase in temperature thereof.

68. (New) The working end of Claim 64, wherein said first body portion has an electrical resistance that decreases with an increase in temperature thereof.

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69. (New) The working end of Claim 64 wherein said first body portion defines a switching range at which its electrical resistance substantially increases or decreases in a selected temperature range.

70. (New) The working end of Claim 69 wherein said switching range falls between about 40° C. and 200° C.

71. (New) A method for controlled application of energy to tissue, comprising the steps of:

providing a working end with opposing jaws for engaging tissue, at least one jaw defining an engagement surface having a first body portion comprising a variably resistive material having a resistance that positively varies in response to a change in temperature and a second body portion comprising at least one conductor, said first and second body portions being coupled to an Rf voltage source;

engaging tissue between the paired jaws; and

delivering Rf energy to said body portions to cause ohmic heating of the tissue, wherein energy application to said tissue is modulated by changes in resistance of said first body portion to prevent substantial desiccation of tissue proximate to the engagement surface;

wherein said first body portion defines a switching range in which its resistivity is increased to substantially terminate electrical current flow therethrough, and wherein ohmic heating of tissue is eliminated as the temperature of the first body portion reaches said switching range.